FIG. 1

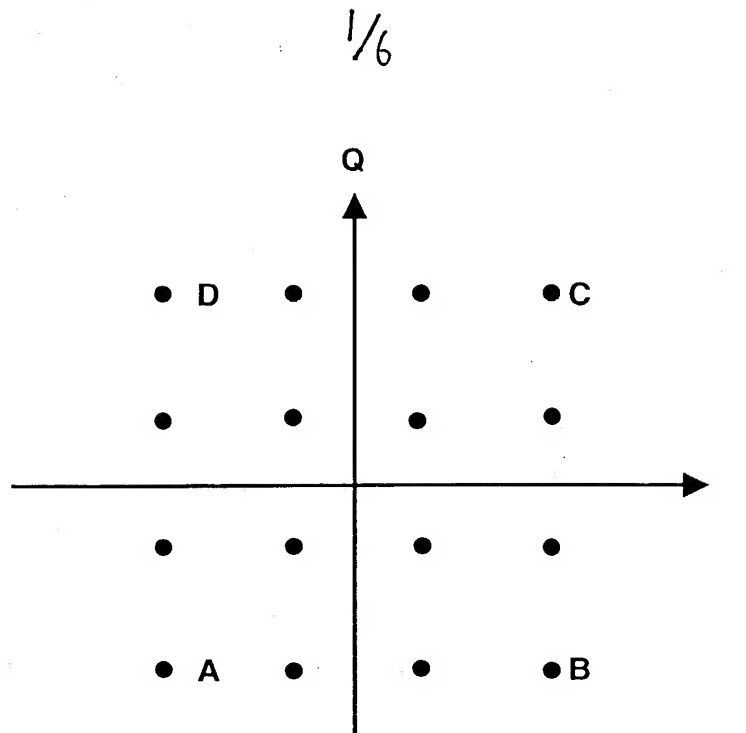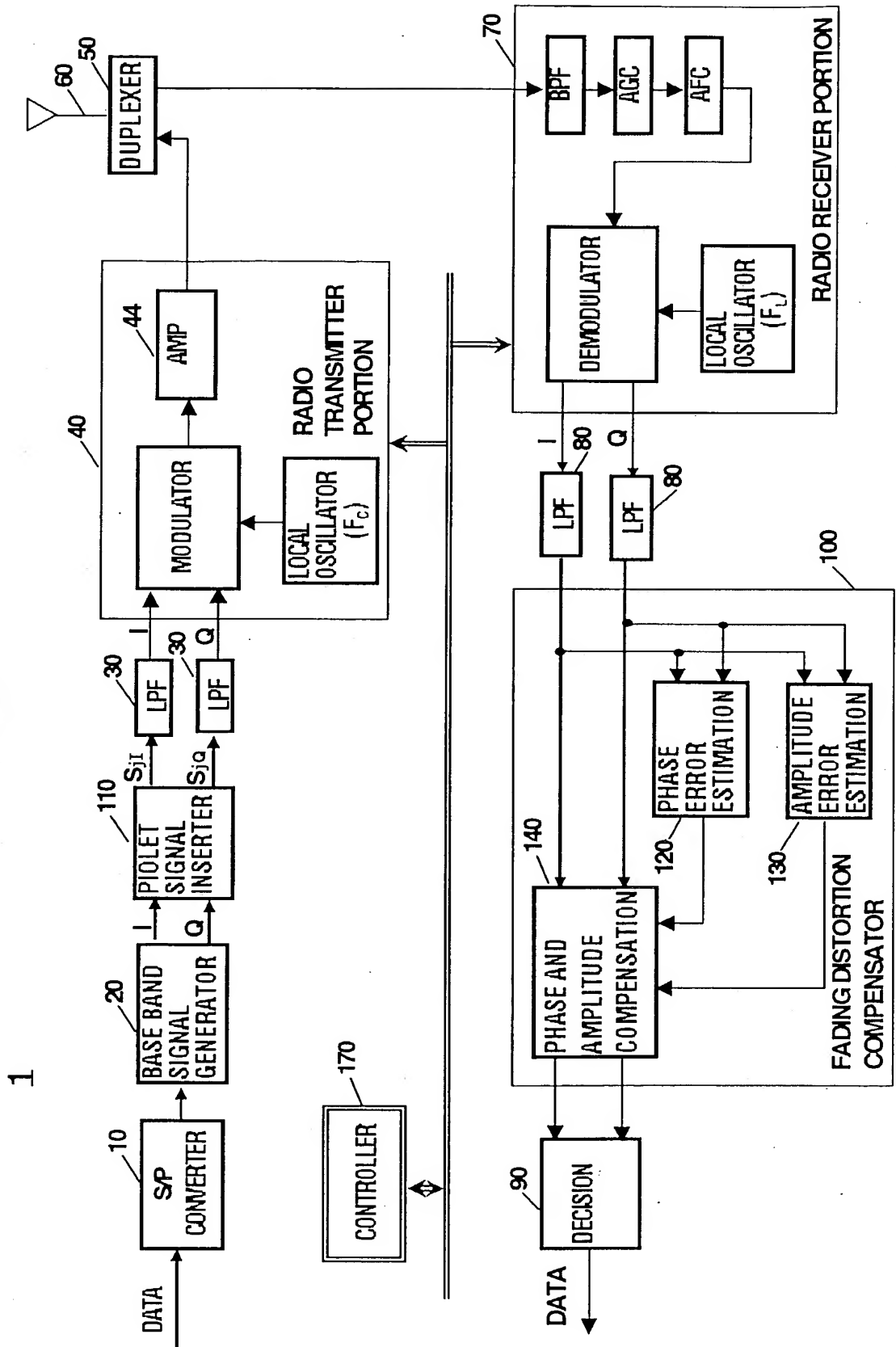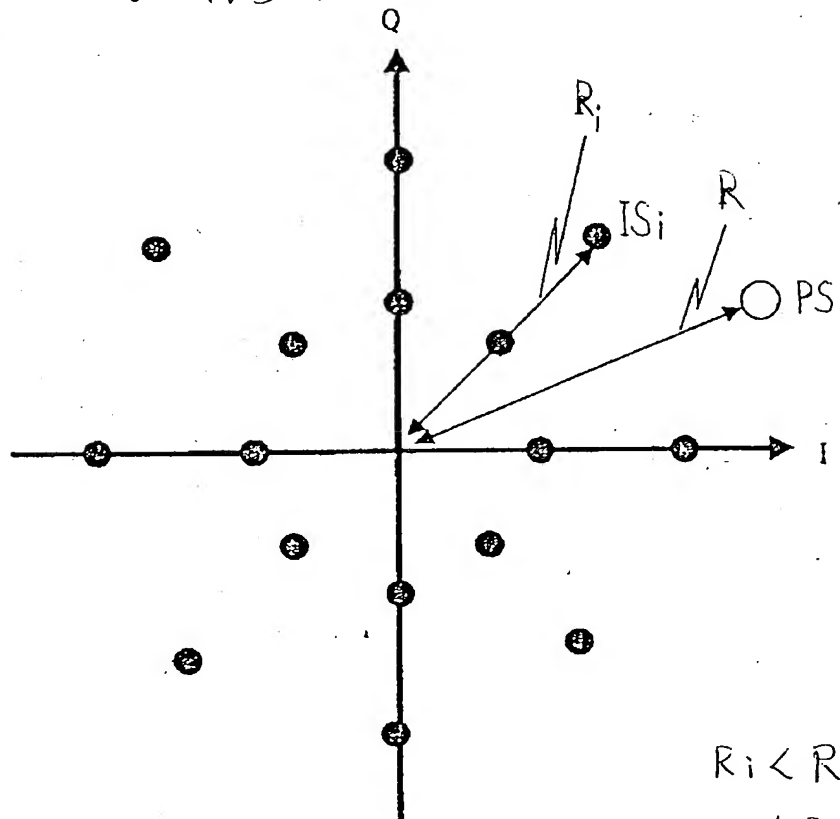# FIG. 2

FIG. 3

16-APSK
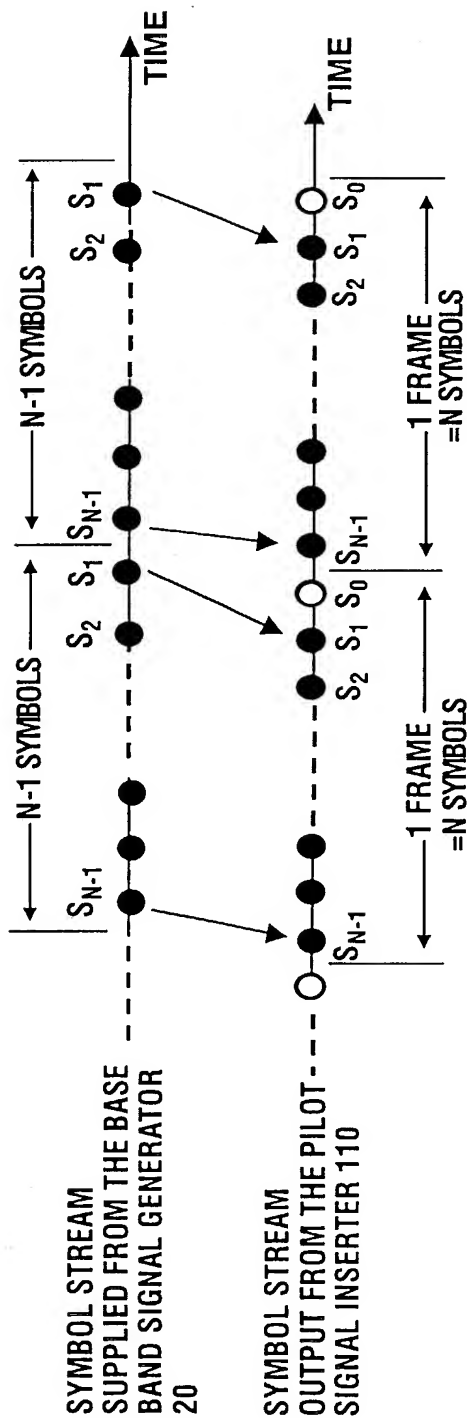

$R_i < R$

$i = 1, 2, \cdots, 16$

FIG. 4

OPERATION OF THE PILOT SIGNAL INSERTER 110

● : INFORMATION SYMBOL (ISi)   i = 1, 2, ..., P

P: THE NUMBER OF POSSIBLE STATES

○ : PIOLET (or FRAME) SYMBOL (PS)

$S_j = \begin{cases} PS & \text{for } j = 0 \\ IS_j & \text{for } j = 1, 2, ..., N-1 \end{cases}$
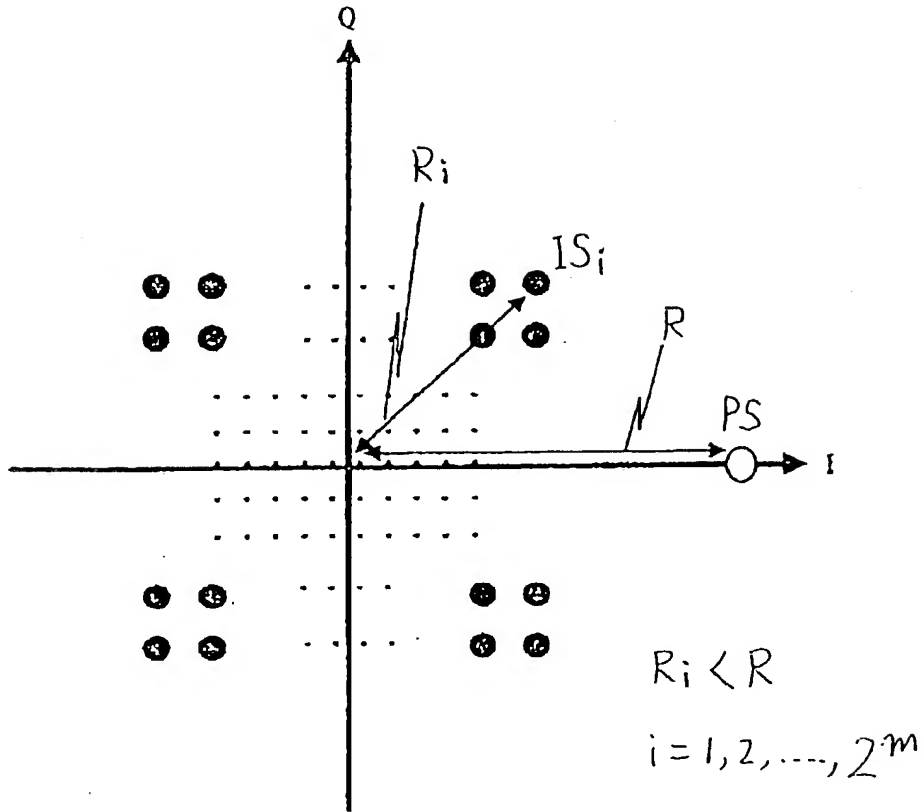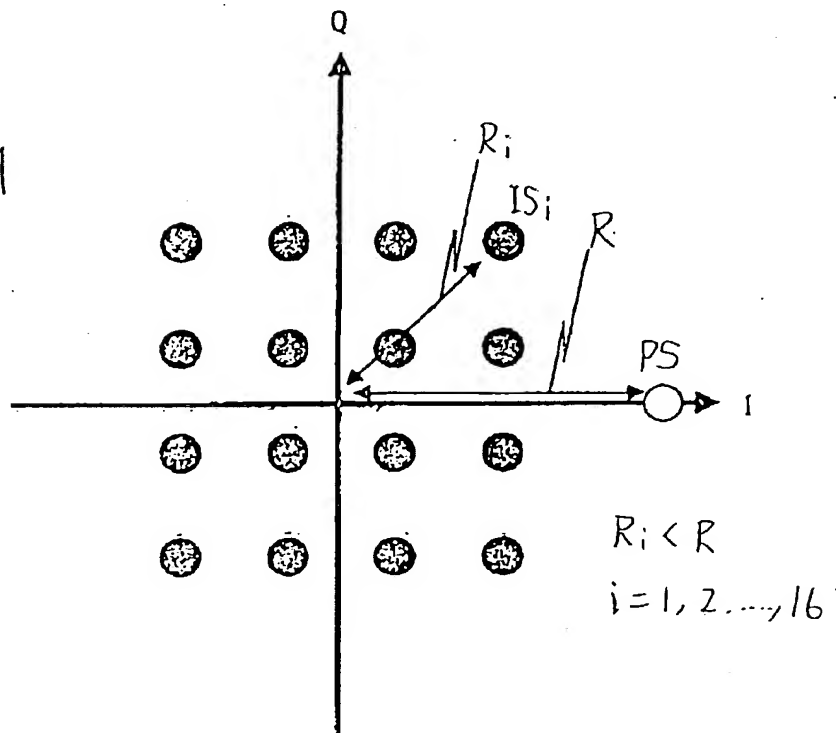
FIG. 5

$2^m - QAM$

$R_i < R$

$i = 1, 2, \ldots, 2^m$

FIG. 6
16-QAM

$R_i < R$

$i = 1, 2, \ldots, 16$

FIG. 7
8-PSK

$r < R$
$i = 1, 2, \ldots, 8$

FIG. 8
QPSK

$< R$
$i = 1, 2, 3, 4$